

Section 1

SPECIALTY SKILLS TRAINING REQUIREMENTS

The purpose of this document is to outline training responsibilities for the offeror and Air Force agencies. The majority of the training required for electrical personnel will be hands-on job site training as outlined by the master task list in section two of this document. Students will be trained to the ‘go’ level. All students for job site training will have prior working knowledge of the tasks contained in section two.

J43.1 Minimum Training Requirement

J43.1.1 Training Plan

The offeror shall submit a training plan as part . Each plan shall contain:

- A **description of all course instructional blocks.** *Each task requirement (or combination thereof) listed in section 2 shall be uniquely developed *into two specific course offerings*. One course instructional block shall meet the needs of Upgrade/Certification Training (UGT); the other shall meet the needs of Qualification/Refresher Training (QT). (See paragraph J43.1.14 & J43.1.15 for details on both training criteria’s)*

Note: Each course instructional block shall be logically assembled using ***all*** tasks necessary to complete a specified training objective. Any qualifications (**prerequisites**) needed to attend a particular course as well as any required Personal Protective equipment (PPE) must be clearly identified by the offeror within the instructional block description. (See Exhibits A & B for a sample **Instructional Block Description** and **Course Instructional Block Listings**)

- **Lesson Plans and Performance Objectives** for all task requirements or logical grouping of tasks.

Note: Plans and objectives shall be reviewed and approved by the government user. (See Exhibit C) As a minimum, developed plans/objectives shall:

- Meet the training requirements identified in the applicable, Air Force Qualification Training Package (AFQTP).
- Use discernable trade language.
- Identify specific learning objectives.
- Identify required tools and equipment (to include student personal protective equipment requirements) needed to perform the task.

- Contain appropriate performance evaluation checklists to measure task performance. (See paragraph J43.1.6.1)
- A **proposed one-year schedule** of course offerings necessary to meet government user training requirements. The proposed schedule shall clearly identify each course's target audience (UGT or QT) as well as all proposed prerequisites. (See Exhibit D for a sample *Course Block Schedule*)
- A **list of certified instructors** capable of administering the intended training. (See paragraph J43.1.5)
- A **list** (to include addresses and phone numbers) **of all fixed training locations and facilities**. If On-The-Job-Training (OJT) is necessary to conduct various courses, **the offeror shall identify the titles of those courses** in the training plan. A list of OJT sites **will not be necessary** for inclusion in the submitted training plan but **may be required by the government user at a later date for emergency contact purposes**.
Exception: the offeror **shall list those fixed OJT locations** such as water and/or wastewater treatment plants in the submitted training plan.

J43.1.2 Training Criteria/Standards

The offeror shall follow industry accepted instructional methods to train and educate students. As a minimum, offeror trainers shall:

- **Plan, conduct, and document training** by preparing and using Lesson Plans and Performance Objectives; giving trainees theory, background information, and hands-on education to enhance training performance.
- **Train students to the “go” level.** “Go” equates to trainees performing the task without assistance and meeting government user approved standards for accuracy, timeliness, and correct use of procedures.
- **Comply with Air Force Social Actions and Human Relation standards.** In general, the offeror shall provide a training environment that is free from unlawful discrimination, sexual harassment, drugs, and alcohol abuse. It shall provide equal opportunity and treatment for all government trainees irrespective of color, national origin, race, ethnic group, religion, or gender.
- **Comply with all Occupational Safety and Health (OSHA) requirements.** In such cases where Air Force directives *exceed* specified OSHA requirements (IAW [Air Force Occupational and Environmental Safety Fire Protection, and Health Program requirements](#)), it shall be the **government user’s responsibility** to specify those directives in the RFP. The government user shall utilize applicable OSHA and supplemental AFOSH requirements as a baseline for conducting periodic training-site inspections. (See paragraph J43.1.13)

J43.1.3 Training Implementation Timeline

Although ultimately affected by final contract approval timelines, every effort shall be made to begin course offerings no later than (NLT) 60 days following the completion of the transition period.

As alluded to throughout this document, AF training is a well-organized program that weighs key goals and objectives against specified timelines. In all but a few cases, completion of training results in the attainment (or maintenance) of a specific skill level. Individual possession of this skill level is mandatory to compete for, acquire, and hold a specific rank (pay grade) within the Air Force. Should training opportunities be postponed (past 60 days), skill level advancement would be jeopardized and individual promotion opportunities and retention impacted.

J43.1.4 Training Roles and Responsibilities (General)

J43.1.4.1 Offeror

- Administers training as requested by the government user.
- Provides all necessary resources (site locations, expendable materials, required equipment, etc) in which to conduct training. [See J43.1.12 for Personnel Protective Equipment (PPE) exclusion]
- Develops course schedules; provides required instructional blocks for both Certification/Upgrade Training and Qualification/Refresher Training.
- Develops course prerequisite requirements; instructs those not meeting prerequisite/skill requirements to return to their assigned units.
- Provides hands on job site training for all assigned government utilities personnel not to exceed the quantity to be trained on the master task list. (See section 2, Master Task List) All hands on job site training will be conducted on _____ AFB properties. Government employees will be trained to the ‘go’ level. The offeror utilities superintendent/foreman will provide weekly work schedules to the _____ AFB utilities superintendent/foremen with an info copy to the Unit Education and Training Manager (UETM). (See paragraph J4.3.1.9.1 for deviations to assigned schedule)
- Appoints primary and alternate points of contact (POC) to oversee program goals and objectives. Submits information on POCs (name, phone number, and methods of contact) to the government user’s Unit Education and Training Manager (UETM).
- Works directly with the UETM to ensure course schedules are clearly identified, student requirements are effectively programmed, and prerequisites are met.
- Coordinates with the UETM when trainees are ready for task certification. (See paragraph J43.1.8.2)

- Provides the UETM with feedback on student performance by completing [Air Force Form 803, Report of Task Evaluation](#) and submitting it to the UETM within 10 working days of course completion. Submits forms via mail or any other government user approved channel.

J43.1.4.2 Supervisor (Government User)

- Conducts initial trainee assessments to identify individual training needs. (Certification/Upgrade Training or Qualification/Refresher)
- Works through UETMs to schedule assigned trainees for contract administered training.
- Ensures applicable trainee prerequisites are met prior to course attendance.
- Documents **training start dates** (as applicable per requirements identified in [AFI 36-2201, Developing, Managing, and Conducting Air Force Training](#)) in appropriate blocks of the STS.
- Ensures trainee task certifications are accomplished in a timely manner. Supervisors shall be notified by the UETM as to the times and dates of required task certifications.
- Documents appropriate training milestones (training starts, problems, training feedback, etc) on the [Air Form 623a, On-The-Job Training Record Continuation Sheet](#).
- Upon receipt of AF Form 803 from the UETM, documents Blocks 3B & 3D, *Training Complete/Training Initials*. Files AF 803 in the appropriate training records.

J43.1.4.3 Certifier (Government User)

- Meets all mandatory certifier requirements specified in AFI 36-2201.
- Provides student task certifications as scheduled through the UETM.
- Uses approved performance checklists to conduct on-site task certifications as requested by the UETM or offeror; documents individual results IAW AFI 36-2201, in the appropriate blocks of the STS. (See paragraph J43.1.8.2)

J43.1.4.4 Unit Education and Training Manager (Government User)

- Ensures contract trainer qualification requirements are IAW paragraph J43.1.5; maintains a current list of authorized contract trainers.
- Works with appropriate supervisors to ensure contract course specifications and schedules meet existing training requirements; schedules periodic reviews.

- Acts as central point of contact for all scheduled training; advises offeror and/or supervisors of any deviations (cancellations, rescheduling, etc.) to course schedules.
- Works with the offeror to schedule student task certifications; coordinates/advises government user certifying officials of scheduled certification requirements. (See paragraph J43.1.8.2)
- Provides the offeror with a current list (name, duty phone, and military address) of approved government user certifying officials.

J43.1.5 Trainer Qualification Requirements

The offeror shall:

- Submit a list of instructors and their credentials to the government user for review and approval. The information shall include, as a minimum, years of work experience, instructional background, and credentials attained.
- Advise the government user of any changes to the instructor list (i.e. instructor additions/deletions). Does so within 10 working days; submits information via mail or any other government user approved channel.

J43.1.6 Training Reference Material

J43.1.6.1 Use

Air Force Qualification Training Package (AFQTP) performance checklists shall be used as a minimum to identify standardized training procedures. In the absence of an AFQTP, the contractor shall use best engineering and management practices to develop an appropriate lesson plan/performance objective. All lesson plans/performance objectives must be reviewed and approved by the government user.

J43.1.6.2 Acquirement

The attached Master Task List (section 2), while viewed in its electronic format, contains numerous hyperlinks to appropriate AFQTPs and/or associated government user reference material. Offerors that do not have, or have limited Internet capability, may request training reference material acquisition support from the government user in the form of:

- Access to specified ". gov" Uniform Resource Locators (URL) addresses.
- Hard copies of reference material.
- A specified combination of both limited URL access *and* hard copy reference material.

AFQTPs and other reference material may be located at:

<http://www.afcesa.af.mil/Directorate/CEO/Training/Enlisted/enlisted.htm>.

J43.1.7 Training Assessments

- **The trainee's supervisor shall conduct assessments** to determine the qualifications of their assigned personnel. The supervisor will use the results of these assessments to identify training requirements and schedule students, via the UETM, for the appropriate blocks of instruction.
- **Assessments may also be conducted by the offeror** prior to the start of each instructional block. Such assessments, if conducted, shall be used to determine whether training prerequisites were met and the student possesses enough experience to safely complete the block of instruction. Students assessed by the offeror as not meeting prerequisite requirements may be refused training. In such cases, the offeror shall:
 - Instruct students to return to their unit of assignment.
 - Notify the UETM of training denial within one working day. The offeror shall also complete and submit an [Air Form 803, Report of Task Evaluation](#) to the UETM. In cases of training denials the offeror shall provide the student's name, course denied, and reason for denial. This form shall be submitted to the government user (UETM) within 10 working days of training denial. Submits information via mail or any other government user approved channel.

J43.1.8 Training Evaluations

Evaluations are used during and after training to determine if training was successful. They also let trainees know how well they are progressing. Structured training frequently uses a combination of **performance/written evaluations and task certifications** to measure whether trainees have met their training objectives.

J43.1.8.1 Performance/Written Evaluations

The Offeror shall use performance evaluations to measure the effectiveness of course material. A performance evaluation is a formal "observed" appraisal of a student's hands-on performance as it applies to meeting a predetermined standard. The offeror may develop and administer written evaluations to measure appropriate levels of task knowledge. Such evaluations will likely be used during classroom settings to ensure task knowledge objectives have been attained.

J43.1.8.2 Task Certifications

An Air Force task certification is a **formal endorsement** (observed and documented in a student's training record) of an individual's ability to perform a task to a required standard. Although the offeror shall be required to conduct performance evaluations to measure student performance (see paragraph J43.1.8.1), **the overall responsibility for conducting any/all task certifications shall remain with the government user** (see paragraph J43.1.4.3). Unless otherwise stipulated by the government user, all task certifications shall be conducted on the training site. **The offeror shall contact the UETM to advise of student task certification times and locations.** The UETM shall be responsible for ensuring government user certifiers are present to accomplish the required certification(s) as arranged by the offeror.

J43.1.9 Training Adjustments

J43.1.9.1 Course Schedule Changes/ Individual Cancellations

Unforeseen changes in business company demands, daily workload requirements, and inclement weather often result in course changes and cancellations. In cases where the company's demands and/or **non-emergency workload** adjustments require the offeror to request course schedule changes, the offeror shall notify the UETM **NLT 10 working days prior the course's original start date**. In cases of **an emergency workload increase**, the offeror shall notify the UETM **as soon as possible but preferably NLT 48 hours prior to course start time**. Inclement weather is considered unavoidable and courses may be cancelled/rescheduled by the offeror as deemed appropriate.

The government user has an obligation to inform the offeror of any student cancellations. Student cancellations of a **non-emergency nature** (i.e. scheduled leaves, noted TDYs, etc.) shall be done no later than five working days prior to the course start date/time. Government user student cancellations of an **emergency nature** (unscheduled military requirement, sickness, etc) shall be done as soon as possible. In both circumstance, the UETM shall be the point of contact for all calls to the offeror.

J43.1.9.2 Course Curriculum Changes

In cases where course curriculum adjustments are required, the contracting officer shall submit to the offeror a comprehensive list of those changes. The offeror, after reviewing the list, shall present to the contracting officer a proposal for providing the requested changes. Following coordination and approval of the modification, the offeror shall implement changes to the affected course curriculum in time for the next course offering.

J43.1.10 Training Categories

As stated throughout this attachment, it is imperative that all government user training be planned, developed, implemented, and managed using a structured approach. Although many training avenues exist to deliver such training, the two most commonly employed mediums are Formal Training and On-the-Job Training (OJT). In an effort to maintain continuity with existing Air Force training methods, **the offeror may develop and use a combination of formal training and OJT**.

J43.1.10.1 Formal Training

Formal training is absolutely critical to Air Force readiness and can be described as a process of teaching students specific skills under defined conditions in pursuit of a task certification. More specifically, formal training is defined simply as training conducted in either a classroom and/or on a dedicated **F** training site. The offeror shall make every attempt to provide formal training when and wherever possible.

J43.1.10.2 On-The-Job (OJT)

OJT can best be described as jobsite conducted, hands-on, over the shoulder training designed to certify trainees on specific tasks. Although not quite as regimented as formal training, OJT still remains a structured event and must be administered by means of a logical and systematic process. Offerors who chose to use OJT as a training medium **shall use a structured approach (i.e. lesson plans/performance objectives) as a way to deliver necessary task knowledge.** The offeror shall deliver this task knowledge to the student prior to any scheduled OJT session. Unless otherwise stipulated by the government user, all task certifications shall be conducted on the OJT training site upon completion of each OJT session. (See paragraph J43.1.8.2 for additional details)

J43.1.11 Transportation Requirements

The Offeror shall be responsible for student transportation requirements while on the training site. The government user shall be responsible for providing student transportation to and from contract training sites. The government user shall refer to the Joint Federal Travel Regulation (JFTR) for guidance in cases where travel exceeds acceptable driving distances.

J43.1.12 Training Resources

The government user shall provide all Personal Protective Equipment necessary to meet training objectives. Accordingly, It will be the student's responsibility to bring all PPE identified in the *Instructional Block Description* (see paragraph J43.1.1 and Exhibit A) to the scheduled training. It is the government user's responsibility to ensure all PPE conforms to OSHA standards. **The offeror shall be responsible for all other resources needed to conduct scheduled training.**

J43.1.13 Air Force Occupation Safety & Health (AFOSH) Evaluations & Inspections

Offerors are responsible for compliance with OSHA and any supplemental AFOSH standards specified by the government user. The Air Force's interest is to protect its personnel training under the Utility Privatization Offeror. Accordingly, the Air Force must ensure a safe and healthy training environment for its personnel.

- To ensure appropriate training environments are maintained, government safety, fire protection, and bioenvironmental engineers may enter an offeror's training site to assess the training conditions of its Air Force personnel. Such visits shall be coordinated through the administrative contracting officer.
- Air Force safety, fire protection, and bioenvironmental engineers **do not have the authority to direct contract training activities unless a condition exists that presents imminent danger to Air Force personnel.** Inspection results will be forwarded to the contracting officer and offeror for review and action as needed.

J43.1.14 Upgrade/Certification Training (UGT)

Upgrade/Certification training is “extensive” *mandatory* skill training that leads a student to a higher level of proficiency and ensures that they can perform their wartime tasking during

wartime/contingency operations. Students in this category acquire an Air Force 5- or 7- skill level (J Journeyman or Craftsman title) after completing training requirements specified in the Career Field Education and Training Plan (CFETP). Per Air Force directive, individuals in this category *must* complete all upgrade training requirements within a specified period of time (typically 12 – 18 months).

J43.1.15 Qualification/Refresher Training (QT)

Qualification/Refresher training is not as extensive as UGT training but is absolutely critical to the maintenance and retention of a student's task knowledge and proficiency; essential requirements for the performance of their job during wartime/contingency operations.

Degradation of these skills can seriously effect wartime/contingency operations, may result in the loss of a student's Air Force skill level (Craftsman Journeyman title), and can have a negative impact on an Air Force's unit Type Code (UTC) rating. The majority of students in this category already possess skills that can be applied to the courses being taken.

J43.1.16 Guest Instructors

There may be occasions when, through prior coordination and approval, the offeror allows a representative of the government user to act as a "guest instructor". In such cases, the guest instructor must first present any verifying work and instruction experience credentials on the selected topic for the offeror to review. Due to its potential impact on contract deliverables, all guest instructor requests shall first be coordinated with the government user's contracting officer.

J43.1.17 Classroom Protocols / Student Discipline

The ultimate responsibility for classroom discipline lies with the course instructor. Students shall adhere to any instruction (given by the instructor or designated representative orally or in writing) that is not illegal, immoral, or unsafe. Rules and consequences shall be clearly stated by the offeror within the ***Instructional Block Description*** (see Exhibit A) and reinforced during the opening of each class. To assist with classroom protocols and student discipline, **the ranking military member shall be responsible** for the class and be prepared to assist the instructor as necessary. In cases where issues of military protocol apply, the ranking military member may act on the inappropriate conduct of the student(s). Any grievances relating to classroom protocols/student discipline shall first be handled through the course instructor. Unresolved issues shall be addressed through the government user UETM.

J43.1.18 Glossary of References, Abbreviations, and Acronyms

J43.1.18.1 References

- [- AFI 36-2201, Developing, Managing, and Conducting Air Force Training\)](#)
- [- AF Form 803, Report of Task Evaluation](#)
- [- AF Form 623a, On-The-Job Training Record Continuation Sheet](#)
- [- AFPD 36-27, AF Occupation & Environmental Safety Fire Protection, & Health Program](#)

J43.1.18.2 Abbreviations and Acronyms

AFI – Air Force Instruction

AFQTP – Air Force Qualification and Training Packages

AF(J)R – Air Force (Joint) Regulation

AFJMAN – Air Force Joint Manual

AFOSH – Air Force Occupational Safety and Health Standard

AWWA – American Water Works Association

CFETP – Career Field Education and Training Plans

IAW – In Accordance With

L&C HB – Lineman's and Cableman's Handbook

Mfg Manual/Instr – Manufacturer's Manuals and Instructions

PPE – Personal Protective Equipment

QT – Qualification / Refresher Training

STS – Specialized Training Standard

TDY – Temporary Duty

UETM – Unit Education and Training Manager

UGT – Upgrade / Certification Training

UTC – Unit Type Code

UP – Utility Privatization

UPC – Uniform Plumbing Code

URL – (Internet listings)

J43.1.19 Terms

Career Field Education and Training Plan (CFETP) — A comprehensive core training document that identifies:

- Life-cycle education and training requirements.
- Training support resources.
- Minimum core task requirements for a specialty

The CFETP aims to give personnel a clear career path and instills a sense of industry in career field training.

Certification— A formal endorsement (observed and documented in a student's training record) of an individual's ability to perform a task to a required standard.

Certifying Official— A person whom the commander assigns to determine an individual's ability to perform a task to required standards.

Go/No Go—The stage at which an individual has gained enough skill, knowledge, and experience to perform the tasks without supervision. Meeting the task standard.

On-the-Job Training (OJT)—Hands-on, "over-the-shoulder" training that a duty location uses to certify personnel in both upgrade (skill-level award) and job qualification (position certification) training.

Qualification/Refresher Training (QT)—Hands-on performance training designed to qualify a student on a specific task. This training typically occurs *after* upgrade training and is focused primarily on maintaining up-to-date qualifications and skills.

Specialty Training Standard (STS)—An Air Force publication that describes skills and knowledge that an airman in a particular career needs on the job. It further serves as an official "contract" between the Air Force education and training process and the actual student to illustrate the overall training requirements for an Air Force career field that formal Air Force schools are required to teach.

Trainer— A trained and certified person who teaches personnel to perform specific tasks through OJT methods.

Upgrade/Certification Training (UGT)— Training that leads a student to the award of a higher skill level. Tasks completed during UGT typically culminate with a formal certification (visual / documented) of the accomplished task.

Section 2

MASTER TASK LIST

OFFEROR NOTES:

1. This template identifies all potential tasks affected by Utility Privatization (UP). It shall be the responsibility of the government user to modify this template as needed to reflect only those requirements affected locally by utility privatization. This document corresponds to the CFEETP. **Please note:** The format of this template is merely a suggestion made by the Air Force Civil Engineer Career Field Manager and may be altered by the government user to suit the individual training needs of the unit.
2. It is not the government user's intent that an individual course be developed for *each* listed task. Conversely, it is strongly suggested that the offeror logically group *similar-type tasks* **into a series of course instructional blocks**. A typical course instructional block example can be found in Exhibit A.
3. A variety of references may be used to develop course instructional block curriculum (to include identified Air Force standards and reference material). Regardless of the choice, *any* curriculum developed shall **reflect only those approved standards/techniques used throughout the electrical industry**. Questions relating to the description of a particular task requirement (to include queries on proposed training standards, methods, and instructional block composition) shall be forwarded to the contracting officer for consultation and clarification.

ELECTRICAL SYSTEMS

TASK #9 - AF OCCUPATIONAL SAFTEY AND HEALTH (AFOSH) PROGRAM

Task #	Task Title/Performance Objective	AF Standards/ References	Qty to Train	Student Required Frequency	QT Training Hours	UGT Training Hours
9.7	Task Title: Safety Standards for AFSs, Confined space, safe entry procedures, test and ventilate for safe entry Performance Objective: Students will open the access point to an enclosed space, test, and then ventilate the air within that space, re-test the air following ventilation, and then enter the space.	<u>AFOSH 91-25</u>	14	Semi-annual	2	4

¹¹ * Denotes 5 level UGT core tasks
**Denotes 7 level UGT core tasks

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			L&C HB	Semi-annual	2	4
9.8	Task Title: Safety Standards for AFSs, Perform rescue, Pole top Performance Objective: Given an overhead line rescue situation, understand and implement procedures associated with pole top rescue operations.		14	Annual	3	6
9.11.1 **	Task Title: Maintenance of distribution system Performance Objective: Maintenance of distribution system over and under 600 volts.					
9.11.2 **	Task Title: Work on energized circuits Performance Objective: Work on energized circuits over and under 600 volts.	<u>AFOSH 91-25</u>		Annual	2	4
9.9	Task Title: Safety Standards for AFSs, Perform rescue, manhole Performance Objective: Given a manhole rescue situation, understand and implement procedures associated with man hole rescue operations.		14	Annual	1	1
9.12 *	Task Title: Hotline tools and Rubber protective equipment Performance Objective: Conduct safety inspections of hotline tools and rubber protective equipment before use.					

MASTER TASK LIST

TASK 15 – SUBSTATION EQUIPMENT

Task #	Task Title/Performance Objective	AF Standards/ References	Qty to Train	Student Required Frequency	QT Training Hours	UGT Training Hours
15.2.3	Task Title: Substation equipment, Install, Potential transformers Performance Objective: Using hand tools, safety equipment, and blocking and tagging procedures safely install potential transformers.	<u>AFIMAN 32-1082</u> Mfg Manuals/Instr.	14	Annual	2	4
15.2.4	Task Title: Substation equipment, Install, Current transformers Performance Objective: Using hand tools, safety equipment, and blocking and tagging procedures safely install current transformers.	<u>AFIMAN 32-1082</u> Mfg Manuals/Instr.	14	Annual	2	4
15.4	Task Title: Substation equipment, Troubleshoot substation equipment Performance Objective: Using hand tools, safety equipment, and blocking and tagging procedures troubleshoot substation equipment to restore correct operations.	<u>AFIMAN 32-1082</u> Mfg Manuals/Instr.	14	Annual	1	3

MASTER TASK LIST

TASK #16 – OVERHEAD DISTRIBUTION SYSTEMS

Task #	Task Title/Performance Objective	AF Standards/ References	Qty to Train	Student Required Frequency	QT Training Hours	UGT Training Hours
16.1.1 *	Task Title: Overhead distribution systems, Climb poles, using gaffs Performance Objective: Use approved methods to safely ascend and descend a wooden utility pole. Accomplish this task using required climbing equipment without falling.	<u>Module #17</u>		Semi-annual	2	3
16.1.2 *	Task Title: Overhead distribution systems, Climb poles, working on pole components Performance Objective: Using approved methods, safely belt-in and un-belt using a safety strap to circle, hitchhike up & down, and obtain a correct work position on a wooden utility pole. Accomplish this task using required climbing equipment without falling.	<u>Module #17</u>		Semi-annual	2	4
16.1.3 *	Task Title: Overhead distribution systems, Climb poles, traversing obstacles Performance Objective: Using approved methods, safely traverse a single crossarm, double crossarm or clevis to obtain a work position on a wooden utility pole. Accomplish this task using required climbing equipment without falling.	<u>Module #17</u>		Semi-annual	2	4
16.3.1	Task Title: Overhead distribution systems, Handle poles, Load/Unload poles Performance Objective: Using approved industry standards, safely handle, load, and unload poles. Accomplish this task without damaging the pole.	L&C HB		Annual	1	2

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					Annual	1	2
16.3.2	Task Title: Overhead distribution systems, Handle poles, Transport poles Performance Objective: Using approved industry standards safely transport pole to and from work sites. Accomplish this task without damaging the pole.	L&C HB	14				
16.3.3	Task Title: Overhead distribution systems, Handle poles, Frame poles Performance Objective: Using approved industry standards safely frame a three-phase wood pole on the ground.	L&C HB	14		Annual	1	3
16.3.4	Task Title: Overhead distribution systems, Handle poles, Set utility poles Performance Objective: Using all necessary equipment, safely install a 40 ft wooden pole.	<u>Module #17</u>		14	Annual	3	6
16.4.1	Task Title: Overhead distribution systems, Install, Guys Performance Objective: Using a variation of gauged wires, properly install guys such as Sidewalk, Overhead, Span, Down, and Stub guys.	L&C HB	14		Annual	2	4
16.4.2	Task Title: Overhead distribution systems, Install, Overhead line conductors Performance Objective: Given various scenarios, use necessary equipment to safely install, sag, secure, and energize overhead line conductors.	<u>Module #17</u>		14	Annual	16	24
16.4.3	Task Title: Overhead distribution systems, Install, Anchors Performance Objective: Given various scenarios, properly calculate anchor installation points/depths and install anchors.	L&C HB	14		Annual	1	2

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			Annual	2	4
16.4.4.1 *	Task Title: Overhead distribution systems, Install, Pole equipment, Conductor support devices Performance Objective: Given various scenarios, use necessary equipment to safely install conductor support devises such as Wooden crossarms, epoxy arms, pin insulators, suspension insulators, and spool insulators.	<u>Module #17</u>	14		
16.4.4.2 *	Task Title: Overhead distribution systems, Install, Pole equipment, Transformers Performance Objective: Given various scenarios, use necessary equipment to safely and properly install transformers using three approaches; installation manually (using a tagline, block & tackle, and transformer gin) directly to utility pole, installation manually using cluster brackets, and installation mechanically (no block & tackle or transformer gin) using a derrick truck winch.	<u>Module #17</u>	14		
16.4.4.3 *	Task Title: Overhead distribution systems, Install, Pole equipment, Protective devices Performance Objective: Given various scenarios, use necessary equipment to safely and properly install over voltage/current protective devises such as lightning arresters and fuse cutouts.	<u>Module #17</u>	14		
16.4.9 *	Task Title: Overhead distribution systems, Install, Grounding set Performance Objective: Using all necessary equipment, properly determine grounding set requirements and install on overhead lines.	<u>Module #17</u>	14	1	2

MASTER TASK LIST

				Annual	2	4
16.4.7 *	Task Title: Overhead distribution systems, Install, Service, Drops Performance Objective: Using all necessary equipment, accurately determine service drop wire dimension and distance. Use acquired information to safely install drop from the service entrance to the transformer.	<u>Module #17</u>	14			
16.4.7.1	Task Title: Overhead distribution systems, Install, Service, Lateral Performance Objective: Using all necessary equipment, safely install service lateral.	L&C HB	14	Annual	2	4
16.5 *	Task Title: Overhead distribution systems, Inspect poles and installed equipment Performance Objective: Given equipment, safely perform an inspection of an overhead distribution system pole and installed equipment.	<u>Module #17</u>	14	Annual	1	2
16.7	Task Title: Overhead distribution systems, Perform recurring maintenance on overhead distribution equipment Performance Objective: Using handtools, test equipment, and blocking and tagging procedures perform recurring maintenance on overhead distribution equipment.	<u>AFJMAN 32-1082</u>	14	Annual	4	8
16.8	Task Title: Overhead distribution systems, Isolate system faults Performance Objective: using test equipment, safety equipment, and blocking and tagging procedures isolate system faults for repair or replacement.	<u>AFJMAN 32-1082</u>	14	Semi-annual	2	4

MASTER TASK LIST

	Task Title: Overhead distribution systems, Splice de-energized overhead conductor	Performance Objective: Given various scenarios, use necessary equipment to safely and properly install a compression sleeve splice and an automatic tension splice on de-energized overhead conductors.	<u>AFJMAN 32-1082</u> L&C HB	14	Annual	2	4
16.9	Task Title: Overhead distribution systems, Splice de-energized overhead conductor	Performance Objective: Given various scenarios, use necessary equipment to safely and properly install a compression sleeve splice and an automatic tension splice on de-energized overhead conductors.	<u>AFJMAN 32-1082</u> L&C HB	14	Annual	2	4
16.10	Task Title: Overhead distribution systems, Splice energized overhead conductor	Performance Objective: Given various scenarios use necessary safety and hot line equipment to safely and properly splice energized overhead conductors.	<u>AFJMAN 32-1082</u> L&C HB	14	Annual	2	4
16.11	Task Title: Overhead distribution systems, Replace conductor supports on energized conductors	Performance Objective: Use necessary safety and hot line equipment to properly replace a crossarm supporting energized conductors.	<u>AFJMAN 32-1082</u> L&C HB	14	Annual	3	6
16.12	Task Title: Overhead distribution systems, Replace conductor support on de-energized conductors	Performance Objective: Use necessary safety and hot line equipment to properly replace a crossarm supporting de-energized conductors.	<u>AFJMAN 32-1082</u> L&C HB	14	Annual	2	4
16.13	Task Title: Overhead distribution systems, Transfer de-energized conductors from old pole to new pole	Performance Objective: After reaching a working position on the pole, use necessary safety and hotline equipment to properly transfer de-energized conductors from an old pole to an adjacent new pole.	<u>AFJMAN 32-1082</u> L&C HB	14	Annual	2	4

MASTER TASK LIST

16.14	Task Title: Overhead distribution systems, Transfer energized conductors from old pole to new pole Performance Objective: After reaching a working position on the pole, use necessary safety and hotline equipment to properly transfer energized conductors from an old pole to an adjacent new pole.	AFJMAN 32-1082 L&C HB	14		Annual	3	6
16.15 *	Task Title: Overhead distribution systems, Perform transformer connections Performance Objective: Given various scenarios, select the proper method to make internal and external connections to a de-energized pole mounted transformer.	Module #17		Semi-annual	1.5	3	
TASK #17 – UNDERGROUND DISTRIBUTION SYSTEMS							
Task #	Task Title/Performance Objective	AF Standards/ References	Qty to Train	Student Required Frequency	QT Training Hours	UGT Training Hours	
17.1.1 *	Task Title: Underground distribution systems, Install, Direct burial cable Performance Objective: Using necessary equipment, properly install direct burial cable.	Module #18		Semi-annual	2	4	
17.1.1.1	Task Title: Underground distribution systems, Install, Underground duct systems Performance Objective: Using necessary equipment, properly select and install earthen buried plastic duct systems.	L&C HB	14		Semi-annual	2	4
17.1.2	Task Title: Underground distribution systems, Install, Underground cable in duct Performance Objective: Using necessary equipment, properly install direct buried cable through a plastic duct system.		14	Semi-annual	1	2	

MASTER TASK LIST

			<u>Module #18</u>	Annual	2	4
17.1.3.1 *	Task Title: Underground distribution systems, Install, Transformers, On pads			14		
	Performance Objective: Using necessary equipment, properly position, place, anchor (if required), connect and energize a transformer on a concrete or equivalent type pad.		L&C HB		Annual	2
17.1.3.2	Task Title: Underground distribution systems, Install, Transformers, In Vaults			14		
	Performance Objective: Using lifting equipment such as forklift or line truck and working in a two or three man team, install a transformer in a vault.				Annual	2
17.1.3.3 *	Task Title: Underground distribution systems, Install, Transformers, Grounding set		<u>Module #18</u>		Annual	1
	Performance Objective: Using necessary equipment, properly install a grounding set on a pad mounted transformer.			14		
17.3.1 *	Task Title: Underground distribution systems, Splice high voltage underground cable, Using tape		<u>Module #18</u>		Annual	2
	Performance Objective: Using necessary equipment, properly apply the correct layers of rubber, plastic, semi conductive, and conductive tape to perform a tape splice on a single conductor, jacketed primary cable.			14		
17.3.2	Task Title: Underground distribution systems, Splice high voltage underground cable, Using pre-form kits		L&C HB		Annual	1
	Performance Objective: Using necessary equipment, properly apply a Slip-On Splice and a Heat Shrink Splice to a single conductor, jacketed primary cable.			14		

MASTER TASK LIST

			Annual	2	4
17.4 *	Task Title: Underground distribution systems, Terminate high voltage underground cable Performance Objective: Using necessary equipment, fabricate a cold shrink type termination and a tape termination to a single conductor, jacketed primary cable.	<u>Module #18</u> L&C HB	14		
17.5.1	Task Title: Underground distribution systems, Inspect, Termination Performance Objective: Using necessary equipment, properly check terminations for serviceability and maintenance.	<u>AEJMAN 32-1082</u> L&C HB	14		
17.5.2	Task Title: Underground distribution systems, Inspect, Underground splices Performance Objective: Using necessary equipment, properly check underground splices for serviceability and maintenance.	<u>AEJMAN 32-1082</u> L&C HB	14		
17.6 **	Task Title: Underground distribution systems, Perform High Potential DC Test on Underground Cable Performance Objective: Using a high potential test set (hy-pot) and a high voltage fault locator (thumper), perform a high potential DC Test on an underground cable.	<u>Module #18</u>	14		
17.7	Task Title: Underground distribution systems, Troubleshoot underground cables for faults Performance Objective: Using necessary equipment, troubleshoot duct housed and direct burial cable for opens, shorts and grounds; conduct locates using a megohmmeter in conjunction with a cable tracer/fault locator.	<u>Module #18</u>	14		

MASTER TASK LIST

17.8 *	Task Title: Underground distribution systems, Trace underground cables with a cable test set Performance Objective: Using industry accepted trace equipment, trace the location and direction of direct burial cable.		<u>Module #18</u>		Annual	.5	1
17.9	Task Title: Underground distribution systems, Isolate system faults Performance Objective: Use approved industry standards to properly and safely isolate (remove voltage from) a system fault.	L&C HB		14	Annual	1	2
17.10 *	Task Title: Underground distribution systems, Fabricate load break elbow Performance Objective: Using applicable load break elbow kit instructions, properly prepare for and install a load break elbow.	<u>Module #18</u>			Annual	1	2

TASK #20 – LIGHTING SYSTEMS (STREET, SECURITY, RECREATIONAL)

Task #	Task Title/Performance Objective	AF Standards/ References	Qty to Train	Student Required Frequency	QT Training Hours	UGT Training Hours
20.3	Task Title: Lighting Systems (Street, Security, Recreational), Install, High Intensity Discharge (HID) Light Fixtures Performance Objective: Using applicable manufactures manuals and instructions, properly prepare for and install a High Intensity Discharge (HID) Light Fixture.	<u>AFIMAN 32-1082</u> Mfg Manuals/Instr.	14	Annual	1	2

MASTER TASK LIST

	Task Title: Lighting Systems (Street, Security, Recreational), Install, Quartz fixtures Performance Objective: Using applicable manufacturers manuals and instructions, properly prepare for and install a Quartz Light Fixture.	<u>AFJMAN 32-1082</u> Mfg Manuals/Instr.	Annual	1	2
20.3	Task Title: Lighting Systems (Street, Security, Recreational), Install, Lighting control components Performance Objective: Using necessary equipment, properly install per manufacture guidance a Central “type” lighting control (i.e. Time switch with an astronomical dial and Contactors controlled by a photo cell) and a Integral “type” control (i.e. Photo cells on each luminaire) on a designated lighting system.	<u>AFJMAN 32-1082</u> Mfg Manuals/Instr.	14		
20.1.3	Task Title: Lighting Systems (Street, Security, Recreational), Install, Lighting control components Performance Objective: Using necessary equipment, properly install per manufacture guidance a Central “type” lighting control (i.e. Time switch with an astronomical dial and Contactors controlled by a photo cell) and a Integral “type” control (i.e. Photo cells on each luminaire) on a designated lighting system.	<u>AFJMAN 32-1082</u> Mfg Manuals/Instr.	14		
20.2.1	Task Title: Lighting Systems (Street, Security, Recreational), Adjust, Controls Performance Objective: Using applicable manufacturers manuals and instructions, properly adjust time switch, contactor, and photo cell lighting system controls.	<u>AFJMAN 32-1082</u> Mfg Manuals/Instr.	14		
20.2.2	Task Title: Lighting Systems (Street, Security, Recreational), Adjust, Fixtures Performance Objective: Using applicable manufacturers manuals and instructions, properly adjust street, security, and recreational light fixtures.	<u>AFJMAN 32-1082</u> Mfg Manuals/Instr.	14	.5	1
20.3	Task Title: Lighting Systems (Street, Security, Recreational), Re-lamp lighting system Performance Objective: Using applicable manufacturers manuals and instructions, properly re-lamp street, security, and recreational light fixtures.	<u>AFJMAN 32-1082</u> Mfg Manuals/Instr.	14	Annual	1

MASTER TASK LIST

2	Task Title: Lighting Systems (Street, Security, Recreational), Troubleshoot lighting system Performance Objective: Using applicable manufactures manuals and instructions, properly troubleshoot and repair street, security, and recreational lighting systems.	<u>AFJMAN 32-1082</u> Mfg Manuals/Instr.	14	Annual	1	2
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TASK #22 – ELECTRICAL GROUND SYSTEMS

Task #	Task Title/Performance Objective	AF Standards/ References	Qty to Train	Student Required Frequency	QT Training Hours	UGT Training Hours
22.1.1	Task Title: Electrical ground systems, Install, Primary distribution system grounds Performance Objective: Using all necessary equipment, properly determine ground requirements and install on primary distribution systems.	<u>AFJMAN 32-1082</u> L&C HB	14	Annual	2	4
22.3.2 *	Task Title: Electrical ground systems, Maintain, Primary distribution grounds Performance Objective: Using all necessary equipment, properly maintain the permanent grounds on a primary distribution system.	<u>Module #23</u>	14	Annual	1	2
22.4.2	Task Title: Electrical ground systems, Test, Primary distribution system grounds Performance Objective: Use portable ground testing equipment or the three-point method to determine the maximum permissible resistance for grounds and grounding systems. Resistance requirements will be predicated on departmental standards, ANSI C2 requirements, or the national electric code.	<u>AFJMAN 32-1082</u>	14	Annual	2	4

MASTER TASK LIST

22.5.1	Task Title: Electrical ground systems, Troubleshoot, Primary distribution system grounds Performance Objective: Using all necessary equipment, troubleshoot the permanent grounds on a primary distribution system.	AFJMAN 32-1082	14	Annual	2	4
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TASK #24 – TOOLS AND EQUIPMENT						
Task #	Task Title/Performance Objective	AF Standards/ References	Qty to Train	Student Required Frequency	QT Training Hours	UGT Training Hours
24.1.1 **	Task Title: Tools & Equipment, Maintain, Hotline tools Performance Objective: Given appropriate hotline tools and Personal Protective Equipment (PPE), use materials such as dry tarpaulins, clean rags, hot-stick nonconductive pole cleaner, hot-stick wax, methyl ethyl kettle (MEK) or acetone, Epoxyglas Bond, and a DC hi-pot test set to inspect, maintain, and test hotline tools. Tested Hotline tools IAW American National Standards Institute/American Society for Testing Materials (ANSI or ASTM) standards.	Module #25	14	Annual	2	4
24.1.2 **	Task Title: Tools & Equipment, Maintain, Rubber Personal Protective Equipment (PPE) Performance Objective: Given appropriate Personal Protective Equipment (PPE), use American National Standards Institute/American Society for Testing Materials (ANSI or ASTM) standards to properly inspect, maintain, and test rubber PPE.	Module #25	14	Annual	1	2

MASTER TASK LIST

					Annual	1	2
24.1.4	Task Title: Tools & Equipment, Maintain, Reel jacks Performance Objective: Use applicable manufacturers manuals and/or agreed upon government standards to inspect and maintain reel jacks.	Use agreed upon standards	14				
24.1.6	Task Title: Tools & Equipment, Maintain, Handline Performance Objective: Use applicable manufacturers manuals and/or agreed upon government standards to inspect and maintain handlines.	Use agreed upon standards	14		.5	1	
24.1.6	Task Title: Tools & Equipment, Maintain, Block & tackle Performance Objective: Use applicable manufacturers manuals and/or agreed upon government standards to inspect and maintain a block and tackle assembly.	Use agreed upon standards	14				
24.1.6	Task Title: Tools & Equipment, Maintain, Chain hoist Performance Objective: Use applicable manufacturers manuals and/or agreed upon government standards to inspect and maintain a chain hoist.	Use agreed upon standards	14		.5	1	
24.1.7 *	Task Title: Tools & Equipment, Maintain, Climbing equipment Performance Objective: Given appropriate climbing equipment, use materials such as neutral soap, neatsoot oil, a gaff gauge, a file and a cleaning cloth to properly inspect and maintain climbing equipment.	<u>Module #25</u>		Annual	2	3	
24.4	Task Title: Tools & Equipment, Test hotline tools Performance Objective: Use manufacturers manuals and an industry approved portable hot stick tester to test hot line tools.	L&C HB	14	Annual	1	2	

MASTER TASK LIST

24.5.12	Task Title: Tools & Equipment, Use test equipment, Gas detector	Mfg Manual/Instr.	Annual	.5	1		
	Performance Objective: Given various scenarios, use manufactures manuals and an industry approved gas detector to inspect confined spaces for combustible /toxic gases.		14				
24.5.14 *	Task Title: Tools & Equipment, Use test equipment, High voltage phase tester	<u>Module #25</u>	Annual	1	2		
	Performance Objective: Given various distribution and transmission circuits, use the high voltage phase tester to measure varying levels of AC voltage.		14				
24.5.18	Task Title: Tools & Equipment, Use test equipment, Cable locator	Mfg Manual/Instr.	Annual	.5	1		
	Performance Objective: Given various scenarios, use manufactures manuals and an industry approved cable locator to properly locate direct buried cable.		14				
24.5.20	Task Title: Tools & Equipment, Use test equipment, High voltage audible indicator	Mfg Manual/Instr.	Annual	.5	1		
	Performance Objective: Given various scenarios, use manufactures manuals and an industry approved high voltage audible indicator to locate direct buried cable.		14				
24.6 *	Task Title: Tools & Equipment, Perform operator's maintenance on aerial lift truck with insulated bucket	<u>Module #25</u>	Annual	1	2		
	Performance Objective: Given any commercially approved aerial lift truck with an insulated bucket, use manufacture manuals & periodic maintenance standards to conduct pre, during, and post operational checks.		14				

MASTER TASK LIST

				Annual	1	2
24.7 *	Task Title: Tools & Equipment, Perform operator's maintenance on line maintenance truck Performance Objective: Given any commercially approved Line maintenance truck, use manufacturer manuals and periodic maintenance standards to conduct pre, during, and post operational checks.	<u>Module #25</u>	14			
24.8 *	Task Title: Tools & Equipment, Operate aerial lift truck controls Performance Objective: Given any commercially approved aerial lift truck with insulated bucket, apply manufacturer guidance and safety precautions to transport, position, operate aloft, and reposition the aerial lift truck. Operational procedures should stress before and during bucket raising, working aloft, and ground operations.	<u>Module #25</u>	14	Annual	1.5	3
24.9 *	Task Title: Tools & Equipment, Operate line maintenance truck controls Performance Objective: Given any commercially approved line maintenance truck, apply manufacturer guidance and safety precautions to transport, position, operate, and reposition the line maintenance truck. Operational procedures should stress boom use, power winch, and capstan use.	<u>Module #25</u>	14	Annual	1.5	3

Exhibit A -- *Sample Instructional Block Description*

**OVERHEAD DISTRIBUTION – INSTALLATION OF UTILITY POLES AND
COMPONENTS**

1. **Course Description.** This course provides training to selected Department of Defense personnel in the knowledge and skills needed to perform the installation of various sized utility poles and applicable components. The scope of training includes procedures on loading and unloading poles, transporting poles, framing poles, and setting poles. Additionally, this course will provide instruction on the installation of guys, overhead line conductors, and anchors.
2. **Applicable AF Tasks.** 16.3.1, Load/Unload Poles; 16.3.2, Transport Poles; 16.3.3, Frame Poles; 16.3.4, Set Utility Poles; 16.4.1, Install Guys; 16.4.2, Install Overhead Line Conductors; and 16.4.3, Install Anchors.
3. **Course length.** 2 – Weeks
4. **Frequency.** Semi-annual
5. **Target Audience.** Certification/Upgrade Training (UGT)
6. **Course Prerequisites.** Completion of the Air Force Apprentice Training Course
7. **Required Personal Protective Equipment.** N/A
8. **Classroom Protocols.** No foods/beverages in classroom settings; smoking allowed in designated smoking areas only; horseplay will not be tolerated; etc.....
9. **Comments.** Information contained within this course shall be “performance” trained and evaluated to the Go/No-Go criteria. Instructional block completion combined with related evaluations of said material by the appropriate Air Force certifying official, signifies the successful completion of this course.

Exhibit B -- Course Instructional Block Listing

UTILITY COMPANY OFFEROR Course Instructional Block Listing							NOTE: Exhibit B depicts a sample training course listing complete with course titles, descriptions, training levels (QT or UGT), prerequisites, annual offerings, and min/max class size requirements. Variations of this sample can be used to aid in development of the offeror's proposed training plan (Section 1; J43.1.1). Please consult the government user UETM for details on preferred format and required information preferences	
Course Title	Course Description	Level of Training	Course Days	Prerequisites	Offerings Per Year	Minimum Student Load	Maximum Student Load	
UGT 1	Overhead Distribution; Utility Poles -- Install, inspect, climb, traverse Poles. Conduct Pole top rescue	UGT	5	3-level	8	2	10	
QT 1	Overhead Distribution; Poles — Install, inspect, climb, traverse Poles. Conduct Pole top rescue	QT	3	5/7-level	8	2	10	
UGT 2	Overhead Distribution; Install conductors, service drops, laterals; replace conductor supports	UGT	5	3-level	4	3	10	
QT 2	Overhead Distribution; Install conductors, service drops, laterals; replace conductor supports	QT	3	5/7-level	4	3	10	
UGT 3	Overhead Distribution; install equipment, install grounding sets, isolate faults, splice/transfer conductors	UGT	5	3-level; Complete UGT 1	4	2	10	
QT 3	Overhead Distribution; install equipment, install grounding sets, isolate faults, splice/transfer conductors	QT	3	5/7-level	4	2	10	
UGT 4	Underground Distribution; install transformers on pads/ vaults, Install grounding sets to transformer	UGT	2	3-level; Complete UGT 5	4	4	10	
QT 4	Underground Distribution; install transformers on pad / vaults Install grounding sets to transformer	QT	1	5/7-level	4	4	10	
UGT 5	Underground (UG) Dist; Install buried cable, duct systems; Inspect/splice/terminate UG cable	UGT	4	3-level	4	4	10	
QT 5	Underground (UG) Dist; Install buried cable, duct systems; Inspect/splice/terminate UG cable	QT	3	5/7-level	4	4	10	

Exhibit C – Sample Lesson Plan/Course Objective



Course Title: UGT 8

INSTALL GROUNDING SET

Install Grounding Set

Task Training Guide

STS Reference Number/Title:	<ul style="list-style-type: none"> • 18.1.5 – Underground distribution systems, install grounding set
Training References:	<ul style="list-style-type: none"> • CDC 3E051B VOL3 • Lineman's and Cableman's Handbook • AFI 32-1064 Electrical Safe Practices • National Electric Safety Code(NESC) • National Electric Code (NEC)
Prerequisites:	<ul style="list-style-type: none"> • Possess as a minimum a, 3E031 AFSC
Equipment/Tools/ PPE Required:	<ul style="list-style-type: none"> • Grounding Set • Hand Tools • Personal Protective Equipment • Rubber Protective Equipment
Learning Objective:	<ul style="list-style-type: none"> • Given equipment, install grounding set on pad mounted transformer
Samples of Behavior:	<ul style="list-style-type: none"> • Follow approved methods while installing grounding set • Know safety requirements for installing grounding set
Notes:	<ul style="list-style-type: none"> • Any safety violation may be grounds for an automatic failure. • Trainer will brief trainee on the components of the particular transformer to be grounded as well as describe operation of the grounding set used.

Background: The purpose of a grounding set is to ground the high voltage side of transformers to bleed off any stray voltage. This voltage could be from the high voltage cables feeding the transformer or from possible back feeds from the secondary side of the transformer. In either case it is important to remove the voltage and ground the transformer. This is done so that work may be accomplished safely around and on the transformer. Grounding sets will have four connection points, three will connect to the transformer while the fourth will connect to the system ground or a temporary ground rod. Grounding sets will have one of two types of connectors: an elbow type or grounding clamp type. Each has similar procedures for installation. Each will be covered in this training package.

Grounding equipment in partially energized substations and vaults.

It is often impractical to leave the equipment being worked on grounded. In the case of indoor equipment, it may be possible to permanently ground the equipment on the outside. This would be possible where oil circuit breakers are being inspected one at a time with disconnects open between the circuit breaker and the bus. By grounding on the outside and closing the oil circuit breaker, everything in the bay is grounded. In other instances, it may be practical to ground on the deenergized side of the open disconnects. Care must be taken to avoid confusion in tracing out the feeder being worked on between the outside and inside construction. Where the feeder is grounded on the outside, the equipment to be worked on should be checked with an approved high voltage testing device and then grounding cables attached before touching it. Where it is practical to leave the equipment grounded while work is in progress, it is mandatory that each phase of the equipment to be worked on is tested to see that it is de-energized and then touched with a grounded cable before the work begins. This should be done even though all disconnects or other devices for clearing the equipment or jumpers to be worked on are in plain view.

To perform this task, follow these steps:

Step 1: Inspect ground set.

The ground set should be inspected to ensure that all the connectors work properly and that the grounding conductor and connectors used are the proper size. The grounding conductor should be inspected for cracked or splitting insulation and tight connection to the connectors.

SAFETY:

THE GROUNDING SET SHOULD BE ABLE TO HANDLE THE MAXIMUM FAULT CURRENT THE SOURCE CAN SUPPLY TO THE JOB LOCATION.

NOTE:

The cable to connector connection for the elbow type set may not be visible however they may be checked with an ohmmeter.

Step 2: Inspect the system ground.

The system ground should be checked for loose connections, signs of corrosion, and room to place the grounding conductor.

NOTE:

If the transformer's system ground is too cluttered or if there is not enough space to make the connection then a temporary ground rod must be used.

NOTE:

If the transformer has a primary and a secondary bonded ground either may be used.

Step 3: Clean contact points.

Clean the area on the ground with a wire brush to remove any oxidation and dirt that may cause poor connection with the grounding set. Clean the contact point or closing jaws of the clamp with the wire brush. All four connectors should be cleaned at this time.

NOTE:

The contact pin on the elbow type should be visibly inspected; cleaning with a wire brush may not be possible.

Step 4: Connect set to ground.

The first connection made is to the ground point (ground rod). The three other ends should be laid out so that they are not to close to the cables feeding the transformer.

Step 5: De-energize the transformer.

NOTE:

Prior to making any connection to the transformer inspect it to see what types of primary connections are used, is it feed through, is it switched, look at the data plate. This will determine the accessories needed to properly ground the transformer.

- Isolate the secondary feed from the building by opening the main breaker or switch.
- Open the primary fuses or primary switch on the transformer if installed.
- Isolate the primary feeding the transformer. Opening the feed from its source (i.e. fuses, vacuum switch, or air break switch) does this.

NOTE:

Feed through transformers can be fed from two sources and both feeds will need to be isolated.

- Test for primary voltage by using a high voltage phase tester (Phasing set or audible noise tester).
- Test the secondary for voltage using an appropriate voltage tester or meter.

NOTE:

All testers and meters should be checked for proper operation on a known energized circuit prior to being used on de-energized circuits and re-verified after use to ensure that they have not been damaged.

NOTE:

Testing the secondary side of the transformer is important because of possible back-feed from another power source (a generator in a different section of the building). With the primary switch or fuses for that transformer open you may not see the back-feed on the primary side when you check it for voltage.

NOTE:

If the transformer has load-break-elbows with the capacitor button you will be able to check for voltage by removing the cap with a universal grip-all stick and placing the tester against the metal button. If using the capacitive type phase tester your reading will be slightly lower than normal for the voltage used on your installation.

Step 7: Connect grounds.

Dead Front Transformers.

Connect the remaining connectors one each to a primary bushing of the transformer.

NOTE:

Care must be taken when making the connection not to pull down too hard on the bushings; an action that could break the seal, cause a leak, or break the bushing.

NOTE:

When making the connection use the appropriate hot stick , there will be a small arch when first contact is made. This is bleeding the residual voltage off the cables and can hurt or kill if not properly protected against.

Live Front Transformers. Place the grounding elbows one-each on the feed-through bushing and close the feed through switch if present. If feed through bushing are not present or in use the input cables should be removed from the transformer bushings and placed on two way parking bushings. Next the grounding elbows are place on the two way parking bushing to ground the in put cables, then on the transformer bushing elbow to ground it.

**Review Questions
For
Install Grounding Set**

Question	Answer
1. The grounding conductors are inspected for _____.	<ul style="list-style-type: none"> a. Cracked insulation with loose connections. b. Splitting insulation and loose connections. c. Cracked or splitting insulation and loose connections. d. Cracked or splitting insulation and tight connections.
2. What is used to clean the contact surfaces of the ground rod and the connector?	<ul style="list-style-type: none"> a. Sand paper b. A wire brush c. A rat-tail file d. Chem.-wipes
3. What is the grounding set connected too first?	<ul style="list-style-type: none"> a. The ground. b. The A phase conductor. c. The ground drip on the termination. d. The parking bushing.
4. If the ground rod is to cluttered or inaccessible what is used as a ground point?	<ul style="list-style-type: none"> a. The transformer case. b. Nothing just lay the ground on the ground. a. The secondary neutral. b. A temporary ground rod.
5. How many sources can a feed through transformer be fed from?	<ul style="list-style-type: none"> b. 4 c. 3 d. 2 e. 1
6. What is done after the power has been isolated to a transformer?	<ul style="list-style-type: none"> a. You should check for continuity. b. You should check for amperage. c. You should check for ohms. d. You should check for voltage.
7. On transformers with one input what should be done with cables that have load-break elbows on them?	<ul style="list-style-type: none"> a. They should be removed and placed out of the way. b. They should be removed and placed on parking bushings. c. They should be removed and place on double breaking brushes. d. They should be removed and placed on double-parking bushings.

INSTALL GROUNDING SET

Performance Checklist

Step	Yes	No
1. Can the individual explain the need to ground the transformer?		
2. When opening the transformer did the individual use proper safety procedures?		
3. Did the trainee perform an inspection of the grounding set prior to use?		
4. If needed, were contact points on connectors cleaned with a wire brush?		
5. Was ground rod inspected for serviceability?		
6. Was power disconnected from all possible sources?		
7. Was transformer tested for the lack of voltage prior to grounding?		
8. Was test equipment verified for proper operation prior to and after checking for voltage?		
9. Was care taken while handling the bushings so not to damage them?		
10. Were proper procedures used when removing and placing load-break elbows?		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and the trainer.

Exhibit D — Sample Course Schedule

March 2001

Sun	Mon	Tue	Wed	Thu		
				1	2 QT 4: UG Dist install pad / vault	3
4	5 UGT 1: Overhead (OH) Dist; poles — Install, inspect, climb, transverse, rescue member	6	7	8	9	10
11	12 QT 1: OH Dist; Poles — Install, inspect, climb, transverse, rescue member	13	14	15 UGT 4: Underground (UG) Dist; in- stall transformers on Pads/in vaults	16	17
18	19 UGT 2: OH Dist; Install conductors, service drops, laterals; replace conductor supports	20	21	22	23	24
25	26 QT 2: OH Dist; Install conductors, drops, laterals; replace con- ductor supports	27	28	29 UGT 8: Install grounding sets	30 QT 8: Install grounding sets	31

NOTE: Section 5 depicts a *sample* training schedule complete with course titles, general descriptions, and the level of training offered (QT or UGT). Additional details on each course offering can be found in section 4, *Course Instructional Block Listing*. Variation of this sample can be used to aid in development of the offeror's proposed training plan (Section 1; J43.1.1). Please consult the government user UETM for details on preferred format and required information preferences.

April 2001

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2 QT 3: OH Dist; install equipment, install grounding sets, isolate faults, splice/transfer conductors	3	4	5 UGT 6: lighting Systems — Install, adjust, troubleshoot, relamp systems/controls	6	7
8	9 UGT 3: OH Dist; install equipment, install grounding sets, isolate faults, splice/transfer conductors	10	11	12	13	14
15	16 UGT 5: Underground (UG) Dist; Install buried cable, duct systems; Inspect/splice/terminate UG cable	17	18	19	20 QT 7: Grounds; PDG fundamentals	21
22	23 QT 5: UG Dist; Install buried cable, duct systems; Inspect/splice/terminate UG cable	24	25	26 UGT 10: Operate testing equipment	27	28
29	30 QT 11: Operate maintain Aerial & Line Maint trucks					

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Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1 QT 6: UG Dist; Install conductors, drops, laterals; replace conductor supports	2	3	4 QT 9: Tools & Equipment; maintain	5
6	7 UGT 7: Grounds; install, maint., test, trouble shoot Primary Dist Grnds (PDG)	8	9 UGT 11: Operate and maintain Aerial & Line Maint trucks	10	11 QT 10; Operate testing equipment	12
13	14 UGT 8: Install grounding sets	15 QT 8: Install grounding sets	16 UGT 9: Tools & Equipment (T&E); maintain	17	18 QT 4: UG Dist install pad / vault	19
20	21 UGT 1: Overhead (OH) Dist; poles — Install, inspect, climb, transverse, rescue member	22	23	24	25	26
27	28 QT 1: OH Dist; Poles — Install, inspect, climb, transverse, rescue member	29	30	31		